

# Changes in acceptance and suppression of negative and positive emotions in patients with depressive disorders: a longitudinal study

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## Summary

**Background:** Difficulties with emotion regulation are present in most mental disorders. However, we know little about changes in negative and positive emotions during the treatment process. The present longitudinal study, therefore, focuses on such changes and investigates acceptance and suppression, separately for negative and positive emotions during the treatment process.

**Aims:** The goals were to investigate whether there is a measurable change of acceptance and suppression of negative and positive emotions during the course of treatment of depressive patients and to investigate how such patients compare at the end of their treatment with healthy controls.

**Method:** The sample comprised 40 patients with a depressive disorder and 29 healthy controls. The Beck Depression Inventory and the State Trait Anxiety Inventory were used to assess symptoms. The Emotion Acceptance Questionnaire – assessing acceptance and suppression of negative and positive emotions – was used twice: once at the beginning and once at the end of treatment.

**Results:** Depressive patients reported a reduced acceptance of positive and negative emotions compared with controls, but they suppressed emotions more intensively. Suppression of negative and positive emotions throughout the study was related to the level of depression and anxiety symptoms.

**Conclusions:** Analysis showed a significant improvement in emotion regulation strategies towards the end of treatment. However, patients did not reach the same level of capability as healthy controls. For future research, we suggest extending the study by observing the specifics of emotion regulation changes over a longer period of time.

**emotion regulation, emotion suppression, emotion acceptance, depressive disorders**

## INTRODUCTION

During the past two decades, emotion regulation has become one of the most intensely developed

areas of theoretical and practical clinical psychology and psychiatry. Gross defines emotion regulation as a set of activities 'by which individuals influence, which emotions they do have, when we have them, and how they experience and express these' [1]. Depending on how well emotional regulation mechanisms function and their impact on human activity, emotion regulation can be helpful in reaching individual goals (adaptive

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and functional emotion regulation) [2–5]. However, maladaptive emotion regulation can be destructive towards the fulfillment of individual and interpersonal goals. Difficulties associated with adaptive and functional emotion regulation are characteristic to most mental disorders.

Impaired emotion regulation can inhibit or disturb multiple areas. Apart from difficulties in the implementation of individual plans, emotion regulation deficiencies can intensify the experience of emotional states, impact psychosocial functioning and contribute to deterioration in general well-being. Dysfunctional emotion regulation strategies prevent people from stopping, eliminating or alleviating difficult emotional states. What is more, they often lead to mental disorders [6]. For instance, acute and long-term negative emotions are typical in anxiety and depressive disorders. This suggests that ineffective emotion regulation has a significant role in the development and maintenance of mental disorders [7–11]. However, emotion regulation does not only influence mental disorders. Faulty emotion regulation can directly or indirectly lead to a deterioration of general health and worsen somatic complaints [12]. The relationship between emotional arousal and cardiovascular disease appears to be a good example of a direct influence of emotions on health, as showed in several studies [13–15]. On the other hand, emotional response can affect health indirectly by activating certain unfavorable or even destructive behavior patterns associated with worsening health, for example in the form of depression or the destructive mechanisms of emotion regulation in alcohol addiction [16,17].

According to a number of studies, emotional acceptance (adaptive emotion regulation strategy) on the one hand and emotional suppression (maladaptive emotion regulation strategy) on the other hand, are the most frequently investigated emotion regulation strategies [3,7,9,18–21]. Aldao et al. conducted a comparative analysis of different emotion regulation strategies and their relationship to psychopathology [22]. They concluded that reappraisal, problem solving and acceptance are the most intensely studied adaptive regulatory strategies, while suppression, avoidance and rumination are the most intensely studied risk factors for psychopathology. However, attention has been shifting recently to the necessity of exploring different regulatory strategies

(for example, acceptance and suppression) separately for negative and positive emotions [23,24].

Emotional regulation deficiencies are related to decreased acceptance and increased attempts to suppress negative and/or positive emotions. Existing studies investigated this in groups of depressive as well as borderline personality disordered patients [23–25]. Despite the fact that the groups were suffering from different mental disorders, no clear differences could be found in the characteristics of their emotion regulation deficiencies. Therefore, the relationship between mental disorder and emotion regulation so far seems to be independent of the type of mental disorder. Nevertheless, emotion regulation dysfunctions are often a kind of harbinger for psychiatric disorders or the development of a psychopathology [26]. This appears to be significant as emotion regulation and psychopathology symptoms seem to mutually influence each other. Additionally, there are reports that show the influence of psychopathology on emotion regulation [27], and several studies have shown evidence of the impact of emotion regulation strategies on the level of depressive and anxiety symptoms [28–30]. The intensity of the observed changes in the depressive-anxiety symptoms is different among patients: sometimes they are so small they are difficult to notice, other times they are transient. The reason for that would be specific emotion regulation strategies influencing recovery [7,20,28,29,31]. Therefore, we may assume that symptom improvements also depend on changes in emotion regulation.

A number of studies have shown a strong association between emotion regulation and depressive symptoms in the past [7,28,32–35]. Therefore, in recent years the focus has often-times been on related topics, such as: investigating changes in emotion regulation during a course of pharmacological treatment [36], different emotion regulation skills training [37–41] and cognitive-behavioral therapy [42]. However, potential causality between changes in emotion regulation and depressive symptoms has yet to be proven. The present longitudinal study aimed to investigate changes in emotion regulation capabilities during treatment as well, however, suppression and acceptance are investigated separately for negative and positive emotions, which is a new aspect in that research

area. We expected that patients with a major depressive disorder (MDD) would show increased suppression and decreased acceptance of both negative and positive emotions at the beginning of inpatient treatment. Furthermore, it was expected that the control group would show a stable level of suppression and acceptance of both negative and positive emotions over time.

Due to the popularity and relevance of the topic to satisfying functioning in everyday life of every individual, numerous studies have already investigated the characteristics of emotion regulation in depressed patients. However, a great deal of studies in the past were carried out without the participation of actual patients, relying on healthy test subjects instead [40,43–46]. With respect to the conclusions and interpretations that have been put forward, this naturally limits possible application. Thus, an advantage of the current study is the participation of a clinical sample.

METHOD

Participants

The study was conducted over a period of almost 2 years, from August 2011 to July 2013. Overall, 68 patients were invited to participate; 28 refused due to various reasons and so 40 patients with major depressive disorder (MDD) diagnosed according to DSM-IV-TR [47] and 29 healthy controls participated in the study.

The sample was drawn from inpatients at the Clinic for Psychiatry and Psychotherapy Bethel, Ev. Hospital Bielefeld, Germany. Since Bethel is

a large complex, consisting of multiple psychiatric wards, patients were recruited from different wards. Thus, patients received similar but not the same treatment. Psychotherapy followed a cognitive-behavioral approach, composed of group therapy sessions (once a week), individual therapy sessions (once a week) and additional therapeutic efforts such as relaxation training, art or music therapy. Medication also varied per patient; it was determined by a psychiatrist on each ward and adapted to the patients’ needs over the course of treatment. Exclusion criteria were psychosis, anorexia, obsessive-compulsive disorder, post-traumatic stress disorder, bipolar disorder, alcohol or drug abuse, neurological disorders affecting the central nervous system, intellectual disability and problems with concentration and attention.

The control group was recruited through advertisements and candidates screened through structured telephone interviews. Interview questions were essentially a subset of the Mini-DIPS questionnaire with focus on overview questions to determine if any disorders were present. Detailed questions concerning, for instance, the strength of the disorder, were not used, as such candidates were not considered fit as controls. Healthy controls were thus free of any axis I or axis II disorders.

Participation in the study was voluntary. The study protocol was approved by a local ethics committee and all participants had given their written informed consent.

Sociodemographic factors in both groups are shown in Table 1. There were no significant differences between the clinical and control groups considering age and gender.

**Table 1.** Demographic data and depression/anxiety symptoms in MDD patients and a control group in the first (T1) and second (T2) measurement.

	MDD patients (N=40)	Control group (N=29)
Demographic data		
Age, years: N (%)	44.52 (SD=9.03)	39.24 (SD=12.03)
Gender, female/male: N (%)	26/14 (65%/35%)	21/8 (72%/28%)
Symptom intensity		
Average state anxiety (T1)	58.65 (SD=10.73)	35.51 (SD=8.64)
Average state anxiety (T2)	52.00 (SD=13.71)	34.58 (SD=8.84)
Average BDI score (T1)	33.75 (SD=10.30)	5.90 (SD=5.45)
Average BDI score (T2)	22.13 (SD=13.25)	5.31 (SD=6.03)

BDI, Beck Depression Inventory; MDD, major depressive disorder.

## INSTRUMENTS

### Clinical examination

Depressive disorders in the clinical group were diagnosed by Diagnostisches Kurzinterview bei Psychischen Störungen (mini-DIPS [48]), which is a short version of Structured Clinical Interview for DSM-IV. To assess the severity of psychopathology, we administered two additional questionnaires: Beck Depression Inventory (BDI II) [49] for assessment of depressive symptoms and State-Trait-Anxiety Inventory (STAI) [50] for assessment of state anxiety symptoms. Depression and state anxiety for both patients and controls are presented in Table 1.

### Emotion regulation

Emotion regulation was assessed via Emotion Acceptance Questionnaire (EAQ; German FrAGe [51]). Since attributes such as 'positive' and 'negative' clearly indicate an evaluation, the questionnaire uses attributes 'pleasant' and 'unpleasant', as these focus on the phenomenon. By making this distinction, the questionnaire decouples the phenomenon from its evaluation (e.g. a pleasant feeling in a certain context might not be a positive emotion). EAQ consists of 32 items and is divided into four scales with 8 items each: (1) Acceptance of Negative Emotions (e.g. 'I usually allow myself to accept unpleasant feelings'), (2) Suppression of Negative Emotions (e.g. 'I try to push aside unpleasant feelings'), (3) Acceptance of Positive Emotions (e.g. 'I can easily let pleasant feelings in'), and (4) Suppression of Positive Emotions (e.g. 'I block out pleasant feelings'). Scales 2 and 4 are inverted scales: high value indicates low suppression and low value indicates high suppression. They were recoded to build scores of the main scales.

Participants had to rate on a 6-point scale how they relate to the scale items: from 1 ('does not apply at all') to 6 ('applies completely'). EAQ contains several optional scales, however, these were not used in the study as they did not contribute to the specific topic; only scales 1 to 4 were used.

Cronbach's alpha and split half reliability were at a highly satisfying level for the total scores (0.91 and 0.89) and sufficient for subscales (0.82–0.90 for Cronbach's alpha and 0.77–0.89 for the

split half reliability). The validity of the EAQ has been certified, with high correlations with comparable questionnaires [51].

## AIMS

The purpose of this study was to investigate whether:

1. depressive patients and healthy controls differ regarding acceptance and suppression of negative and positive emotions at two different measuring points
2. there is any relationship between acceptance and suppression of positive and negative emotions and depressive and/or anxiety symptoms.

Both aims concern changes of acceptance and suppression of negative and positive emotions during the course of illness in depressive patients.

## STUDY DESIGN

This was a longitudinal clinical study. BDI II and STAI were used to assess symptom intensity. Emotion regulation of negative and positive emotions was assessed by EAQ. Symptom intensity and emotion acceptance and suppression were measured at the beginning (T1) and at the end (T2) of inpatient treatment (on average after about 8 weeks). Emotion regulation data were analyzed using SPSS version 20.0 via analyses of variance (ANOVA). Depressive and anxiety symptoms were compared by means of *t*-tests. Pearson's linear correlation coefficient was applied to calculate the relationship between emotion suppression/acceptance and depression/anxiety symptom intensity in both groups. Demographic variables are presented in the form of mean  $\pm$ SD (age, basic school education) and percentage (gender). Statistical significance was set at  $p < 0.05$ .

## RESULTS

Group differences in emotion acceptance

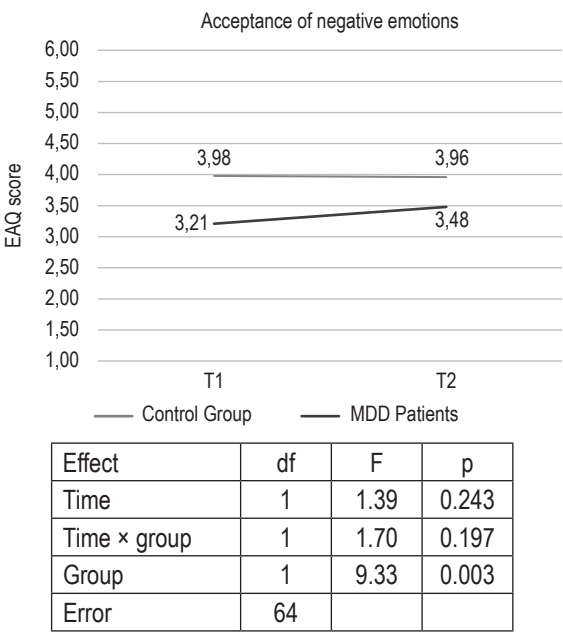


Figure 1. Acceptance of negative emotions. Analysis of variance (ANOVA)

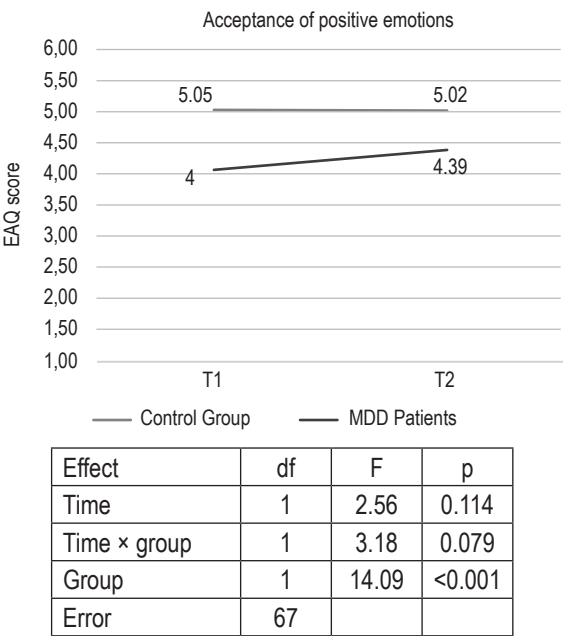


Figure 2. Acceptance of positive emotions. Analysis of variance (ANOVA)

According to our expectations, MDD patients declared a lower level of emotion acceptance than controls for both positive and negative emotions at the first point of measurement (Figure 1 and Figure 2). Patients did not achieve the score of healthy controls at the second point of measurement either, but their emotion acceptance was improved for both positive and neg-

ative emotions. As expected, emotion acceptance in the control group remained stable. For patients as well as controls acceptance of positive emotions was better than acceptance of negative emotions. Group differences in emotion suppression

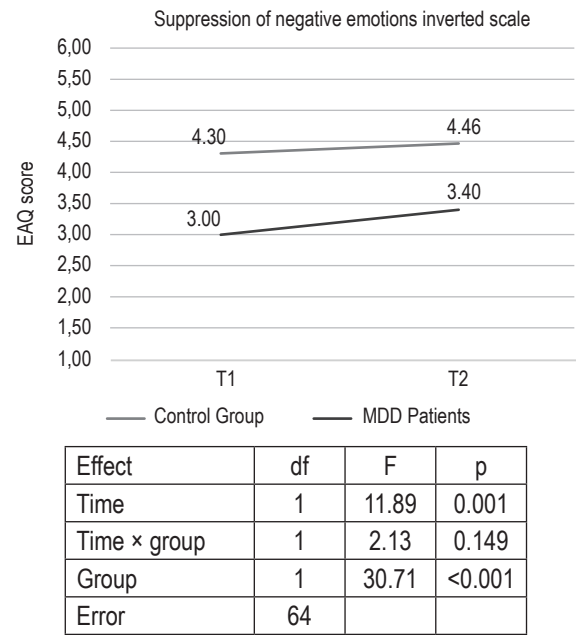


Figure 3. Suppression of negative emotions. Analysis of variance (ANOVA)

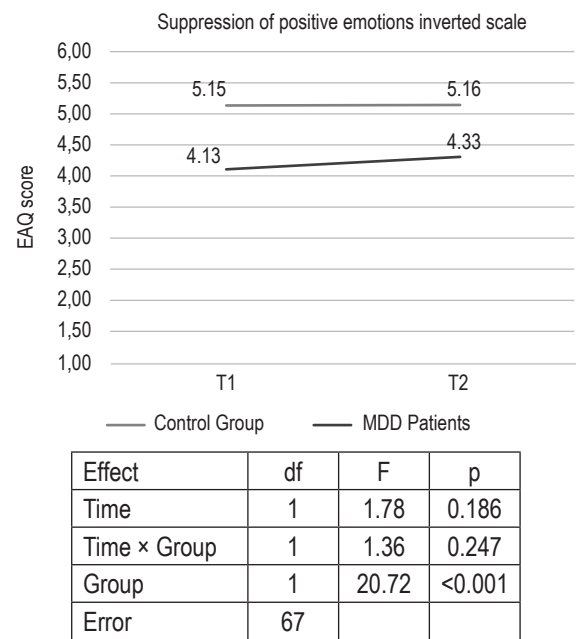


Figure 4. Suppression of positive emotions. Analysis of variance (ANOVA)

With regard to emotion suppression, patients presented higher than controls levels of nega-



tive and positive emotion suppression at the beginning of their inpatient treatment (Figure 3 and Figure 4). Intensity of emotion suppression differed for both groups at the second point of measurement. The results showed changes in emotion suppression during the course of illness in the clinical group. Scores for the control group remained constant. Regarding emotion suppression level, patients as well as controls suppressed negative emotions more intensely than positive emotions.

### **Emotion regulation and symptom intensity**

Impaired emotion regulation (higher level of suppression, lower level of acceptance) in patients is related to increased depressive and anxiety symptoms scores. Average symptoms remained higher in the clinical group at both points of measurement, however, the scores were lower at the end of treatment. In controls, there was also a negative correlation between emotion regulation and intensity of psychopathology features. This means that more suppression and less acceptance of positive/negative emotions was related to higher symptom ratings of depression and anxiety ( $r=-0.51$ ,  $p=0.001$ ).

### **Changes of acceptance and suppression of negative and positive emotions**

Depressive patients reported a reduced acceptance of positive and negative emotions. Patients also suppressed emotions more intensively than controls. In addition, there was a trend for an interaction between time and group with respect to the acceptance of positive emotions (Figure 2). Post-hoc analysis revealed that emotion acceptance increased over time for depressive patients ( $p = 0.011$ ) whereas it did not change for healthy controls ( $p = 0.905$ ). The difference between depressive patients and healthy controls was significant at the beginning (T1) but not at the end (T2) of treatment ( $p < 0.001$  and  $p < 0.10$ , respectively). Although depressive disorder symptoms reported by patients were reduced at T2, patients were still clearly more impaired than healthy controls ( $p < 0.001$ ).

## **DISCUSSION**

We believe this is the first longitudinal investigation that assessed suppression and acceptance separately for negative and positive emotions in a group of MDD patients and healthy controls. The main conclusion of this study is that emotion regulation in depressive individuals changes over time and in a certain direction. Patients' emotion regulation abilities improved during the study (which ran parallel to their treatment), meaning emotion acceptance increased, while emotion suppression decreased. That being said, in comparison to the healthy control group, patients were still more impaired in both areas: emotion regulation and depressive-anxiety symptomatology. As Aldao et al. [22] pointed out, literature on emotion regulation does not examine specific emotion-regulation strategies in clinical groups, especially with regard to longitudinal data. We think that our results contribute by filling this gap in emotion regulation research.

Concerning the topic of emotion suppression and acceptance in MDD patients, the results are coherent with several prior investigations. We found evidence that depressed patients are suppressing their negative but also their positive emotions more intensely than healthy people, which is in line with previous studies [9,23,52]. Furthermore, there was a strong relationship between regulatory strategies and symptom intensity at the beginning of treatment as well as at the end. Suppression of emotions, particularly negative ones, intensifies negative emotional states, which may lead to emotional disorders [9,10,43]. That is why suppressing emotions is usually considered a maladaptive strategy. In case of acceptance, a higher score allows to predict a lower psychopathology level. The study results confirmed our expectation that emotion regulation is a process which changes over time. This change seems to influence symptom intensity. During the treatment process the intensity of the adaptive strategy (acceptance) increases, while the maladaptive strategy (suppression) diminishes. Therefore, the study shows that depressive individuals are able to improve their emotion regulation over time, albeit those improvements still cannot be interpreted as a causal relationship between emotion regula-

tion and symptom severity. With regard to emotion regulation, not all patients improved at the same rate or to the same extent until the end of their treatment. The symptomatology level also varied. On the one hand that is understandable, as changes do not happen in every individual at an equal pace. On the other hand, that could be the reason for lasting differences between both groups at the second measure time. While the data allow predicting the direction of emotion regulation changes, we unfortunately cannot anticipate whether patients are able to achieve the same average level of emotion acceptance and suppression as healthy controls and if so, whether that level can be stable over time. In order to investigate this aspect at least one more measurement point, after a longer time period – when the criteria for the MDD are not satisfied anymore – would be necessary. If the study were designed with three or even more measurement points, other phenomena (such as personality structure of the subjects) should be taken into consideration and controlled. This is especially interesting, as personality has a kind of a mediator role in the development of regulatory strategies [53,54]. That being said, controlling this factor is difficult, as personality of depressed people is believed to change over time [55–57].

Overall, we can summarize that MDD patients reported increased suppression and decreased acceptance of both negative and positive emotions as well as an increased level of psychopathology symptoms. Emotion suppression and depressive-anxiety symptoms were positively correlated, while emotion acceptance and symptom intensity were negatively correlated. Those relationships are equal for the first and second measurement.

## LIMITATIONS

The study had certain limitations, which should be pointed out. Firstly, it relied exclusively on self-report measurement tools (questionnaires). Therefore, the reported answers are of subjective nature, which is a challenge for scientific investigations. All the same, emotions are in the great part subjective phenomena and thus perfect measuring instruments are yet to be devel-

oped. Although methods to test regulatory strategies do exist (e.g. neuroimaging tests or examinations of physiological reactions), it is questionable whether they are more accurate than subjective reported feelings. That is because it is difficult to formulate task instructions in such a way that participants know for sure what they should do with their feelings. It is even harder to test whether participants did understand the instruction correctly.

A further limitation is that only a relationship but no causal conclusion with respect to emotion regulation and symptomatology could be achieved by this study. Patients were treated for their disorders with pharmacotherapy as well as psychotherapy. Psychotherapeutic treatment was not identical for all patients, as their needs were different. Unfortunately, we are unable to conclude which aspects of a patient's treatment (individual psychotherapy, group psychotherapy, relaxation, art therapy or maybe the mix of all) were of greatest importance for the improvement of emotion regulation. The size of both the study group and the control group was relatively small for the application of statistical methods, which limits the stability of presented results. For that reason, the clinical group was not further divided into different subgroups with regard to the type of treatment. It would be important to repeat the study involving a larger clinical group.

For future research endeavors, we suggest extending the duration of the study with the aim of observing the specifics of emotion regulation changes over a longer period of time. Additional measuring points should help to reach a more detailed understanding, which may result in a true description of the dynamics of emotion regulation, including direction and strength of development. This may potentially also uncover what levels of emotion regulation patients are able to reach when in full remission.

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